

CLAIMS

What is Claimed is:

1. A method of sensing and controlling a temperature of a resistive element
5 configured for use in a read/write head of a magnetic data storage device, the method comprising:
detecting a voltage across the resistive element, the voltage varying as a function
of a temperature of the resistive element;
comparing the voltage to a predetermined value to determine a variation of the
10 voltage from the predetermined value; and
altering a power applied to the resistive element based on the variation, the
temperature of the resistive element varying as a function of the altered applied power.
2. A method according to claim 1, wherein the resistive element is selected from
15 the group consisting of a read transducer, a write transducer, a heating element, and a
temperature sensing material.
3. A method according to claim 1, wherein the resistive element comprises
material selected from the group consisting of magneto-resistive (MR) material, giant
20 magneto-resistive (GMR) material, tunneling magneto-resistive (TuMR) material,
current perpendicular to plane (CPP) material, and temperature sensing material.

4. A method according to claim 1, wherein detecting a voltage further comprises detecting a voltage across the resistive element using an output of a lowpass filter coupled to the resistive element.
- 5 5. A method according to claim 1, wherein detecting a voltage further comprises detecting a voltage across the resistive element when there is no power applied to the resistive element.
6. A method according to claim 1, wherein altering a power applied to the resistive
10 element comprises altering a voltage applied to the resistive element.
7. A method according to claim 1, wherein altering a power applied to the resistive element comprises altering a current applied to the resistive element.
- 15 8. A method of sensing and controlling a temperature of a first resistive element configured for use in a read/write head of a magnetic data storage device, the method comprising:
- detecting a voltage across a second resistive element thermally proximate to the first resistive element, the voltage varying as a function of a temperature of the second
20 resistive element;
- comparing the voltage to a predetermined value to determine a variation of the voltage from the predetermined value;

altering a power applied to the second resistive element based on the variation,
the temperature of the second resistive element varying as a function of the altered
applied power; and

affecting the temperature of the first resistive element with the temperature of
5 the second resistive element due to the thermal proximity.

9. A method according to claim 8, wherein the first resistive element is selected
from the group consisting of a read transducer, a write transducer, a heating element,
and a temperature sensing material.

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10. A method according to claim 8, wherein the second resistive element is selected
from the group consisting of a read transducer, a write transducer, a heating element,
and a temperature sensing material.

15 11. A method according to claim 8, wherein the first or second resistive elements
comprise material selected from the group consisting of magneto-resistive (MR)
material, giant magneto-resistive (GMR) material, tunneling magneto-resistive (TuMR)
material, current perpendicular to plane (CPP) material, and temperature sensing
material.

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12. A method according to claim 8, wherein detecting a voltage further comprises detecting a voltage across the second resistive element using an output of a lowpass filter coupled to the second resistive element.

5 13. A method according to claim 8, wherein detecting a voltage further comprises detecting a voltage across the second resistive element when there is no power applied to the resistive element.

14. A method according to claim 8, wherein altering a power applied to the second
10 resistive element comprises altering a voltage applied to the second resistive element.

15. A method according to claim 8, wherein altering a power applied to the second resistive element comprises altering a current applied to the second resistive element.

15 16. A system for sensing and controlling a temperature of a resistive element configured for use in a read/write head of a magnetic data storage device, the system comprising:

a resistive element having a voltage thereacross, the voltage varying as a function of a temperature of the resistive element;

20 comparison circuitry configured to compare the voltage across the resistive element with a predetermined value, and to generate an error signal based on the comparison; and

a control compensation module configured to receive the error signal and to alter a power applied to the resistive element based thereon, the temperature of the resistive element varying as a function of the altered applied power.

5 17. A system according to claim 16, wherein the resistive element is selected from the group consisting of a read transducer, a write transducer, a heating element, and a temperature sensing material.

18. A system according to claim 16, wherein the resistive element comprises
10 material selected from the group consisting of magneto-resistive (MR) material, giant magneto-resistive (GMR) material, tunneling magneto-resistive (TuMR) material, current perpendicular to plane (CPP) material, and temperature sensing material.

19. A system according to claim 16, further comprising a lowpass filter coupled
15 across the resistive element for detecting the voltage across thereacross by isolating low frequency signals received from the resistive element.

20. A system according to claim 16, wherein the control compensation module is further configured to alter a voltage applied to the resistive element:

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21. A system according to claim 16, wherein the control compensation module is further configured to alter a current applied to the resistive element.

22. A system according to claim 16, wherein the control compensation module comprises a control compensation software module.

5 23. A system according to claim 16, wherein the control compensation module comprises control compensation circuitry.

24. A system according to claim 16, wherein the resistive element is a first resistive element, the system further comprising:

10 a second resistive element located thermally proximate the first resistive element and having a voltage thereacross, the voltage varying as a function of a temperature of the second resistive element, and

wherein the comparison circuitry is configured to compare the voltage across the second resistive element with a predetermined value, and to generate an error signal

15 based on the comparison, and

wherein the control compensation module is configured to alter a power applied to the second resistive element based on the comparison, the temperature of the second resistive element varying as a function of the altered applied power and the temperature of the first resistive element varying with the temperature of the second resistive

20 element due to the thermal proximity.